Trauma and Posttraumatic Stress Disorder in People With Schizophrenia

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This study evaluated the hypothesis that trauma and posttraumatic stress disorder (PTSD) severity would be positively associated with schizophrenia symptoms. Forty-seven clients with schizophrenia were assessed for schizophrenia severity and for lifetime trauma history and PTSD symptoms in 2 independent symptom interviews; 35 (74%) participants reported at least 1 event in which there was threat of harm or life threat and subjective distress, and 6 (13%) had current PTSD. Trauma across the life span was associated with greater severity of PTSD. Within the total sample, PTSD symptoms were associated with greater emotional distress, but not with schizophrenia-specific symptoms. Distress among clients with schizophrenia and PTSD suggests the need for routine assessment of PTSD and development of PTSD interventions in this population.

The rate of trauma in the general population is substantial (e.g., 56%; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995), but evidence suggests that individuals with severe psychiatric disorders, such as schizophrenia, are even more vulnerable to trauma exposure. Specifically, several studies have documented high rates of trauma in individuals with severe mental illness, with estimates of lifetime rates of interpersonal violence ranging from 51% to 97% (Goodman, Rosenberg, Mueser, & Drake, 1997). In addition to high rates of trauma in persons with severe mental illness, some research also suggests correspondingly high rates of posttraumatic stress disorder (PTSD). Reported rates of current PTSD in people with severe mental illness range from 29% to 43% (Cascardi, Mueser, DeGiralomo, & Murrin, 1996; Craine, Henson, Colliver, & MacLean, 1988; Mueser et al., 1998; Mueser et al., 2001; Mueser et al., in press; Switzer et al., 1999). In studies specifically examining individuals with schizophrenia, rates of PTSD have been documented at 28% and 29% (Mueser et al., 1998; Mueser et

al., in press). Overall, the rate of current PTSD appears higher among people with schizophrenia compared to the general population, in which the lifetime rates are estimated at 8% to 9% (Breslau et al., 1998; Kessler et al., 1995).

Although these studies have documented the scope of the problem of trauma within the psychiatric population, there are several limitations. For example, although the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995) is the most researched and accepted method for obtaining diagnostic and severity information (Weathers, Keane, & Davidson, 2001), only one study (Mueser et al., 2001) has utilized this assessment tool. Also, trauma assessments have often been limited to one or two specific traumatic events (e.g., sexual or physical assault) and/or to a specific time period (e.g., childhood). Three studies (Mueser et al., 1998; Mueser et al., 2001; Switzer et al., 1999), of which only one also used the CAPS, have examined rates of traumatic events across the life span among people with schizophrenia.

The vulnerability–stress model of schizophrenia posits that the interaction of psychosocial stressors with a biological vulnerability for schizophrenia results in symptom exacerbations (Yank, Bentley, & Hargrove, 1993), and there is ample evidence to support this (e.g., Bebbington & Kuipers, 1994; Norman & Malla, 1993). Taken within this framework, the experience of trauma could act as a psychosocial stressor, and therefore contribute to higher levels of schizophrenia symptoms (Mueser, Rosenberg, Goodman, & Trumbetta, 2002). We located one study that directly tested this hypothesis. Ross, Anderson, and Clark (1994) found that individuals with a history of childhood physical or sexual abuse had significantly more severe positive symptoms of schizophrenia than those without such a history, as well as more severe symptoms overall. Additional, albeit indirect, support for this hypothesis comes from the robust literature showing a relationship between trauma history and psychotic symptoms, as well as other psychiatric symptoms (Mueser et al., 2002).

One possible pathway for the effect of trauma on schizophrenia symptoms is through PTSD. Mueser et al. (2002) hypothesized that each of the three symptom clusters of PTSD influence the course of schizophrenia, ultimately resulting in more frequent relapses and higher symptom severity. According to this expanded version of the vulnerability–stress model, reexperiencing symptoms of PTSD (e.g., memories and thoughts of the trauma) act as stressors, avoidance symptoms affect schizophrenia symptoms through increased social avoidance, and hyperarousal symptoms negatively impact schizophrenia through physiological pathways. Initial support for the direct effect of PTSD symptoms on schizophrenia comes from work by Sautter et al. (1999), who reported that veterans with a psychotic disorder and comorbid PTSD evidenced significantly higher levels of positive symptoms and general psychopathology than did groups of veterans with either PTSD or a psychotic disorder alone.

Whereas the evidence is strongest for the hypothesis that PTSD symptoms exacerbate psychotic symptoms, it is possible that the relationship between the symptoms of the two disorders is bidirectional. For example, there is an increased risk for the development of PTSD in individuals with a comorbid disorder (Kessler et al., 1995), or a history of psychiatric disorder (Brewin, Andrews, & Valentine, 2000). However, we found no studies to support the direct influence of PTSD symptoms on severity of schizophrenia-specific symptoms.

Thus, we had two goals in this study. First, we hoped to replicate the findings of Mueser et al. (2001) and examined the number and type of traumatic events across the life span in a sample of individuals with schizophrenia or schizoaffective disorder, and evaluated PTSD using a structured clinical interview. As noted previously, co-occurrence of PTSD and schizophrenia has not been well documented in the literature using rigorous assessment methods. Second, we explored the relationship between trauma, PTSD, and the severity of schizophrenia symptoms. This is the first study to examine these relationships using independent, clinician-administered symptom assessments. We hypothesized that lifetime trauma severity and PTSD severity would be associated with more severe schizophrenia symptoms.

Method

Recruitment

The sample included clients from four community mental health centers in central Indiana. Clients learned about the study either from their clinicians or at community meetings at the mental health center, and were eligible to participate if they met the following criteria: diagnosis of schizophrenia or schizoaffective disorder, between 18 and 65 years of age, and willing to sign informed consent. Initially, we recruited only women because of the higher rates of PTSD in women in the general population (Breslau, Davis, Andreski, Peterson, & Schultz, 1997; Kessler et al., 1995; Kessler et al., 1999). However, after difficulty with recruitment, and new research suggesting that rates of PTSD in individuals with schizophrenia were similar for men and women (Mueser et al., 1998; Mueser et al., in press), we decided to recruit men as well. No information was obtained about individuals who did not participate in the study.

Measures

Background and mental health variables. Demographic and mental health data were obtained by interview. The Structured Clinical Interview for *DSM–IV* Axis I Disorders, Research Version, Patient Edition (SCID–I/P; First, Spitzer, Gibbon, & Williams, 1998) was used to confirm the diagnosis of schizophrenia or schizoaffective disorder.

Schizophrenia severity. Symptoms of schizophrenia were measured with the 30-item Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein, & Opler, 1987), using the factor structure described by Bell, Lysaker, Beam-Goulet, Milstein, and Lindenmayer (1994) with five subscales: Positive (delusions, unusual thoughts, hallucinations, suspiciousness, somatic concern, grandiosity); Negative (passive withdrawal, emotional withdrawal, blunted affect, lack of spontaneity, poor rapport, motor retardation, disturbance of volition, preoccupation); Hostility (hostility, excitement, poor impulse control, uncooperativeness); Cognitive (conceptual disorganization, poor attention, lack of insight, stereotyped thinking, mannerisms and posturing, difficulty in abstraction, tension); and Emotional Discomfort (depression, anxiety, guilt, active social avoidance). Means were calculated for the total PANSS and each subscale, and scores ranged from 1 (*absent*) to 7 (*extreme*). Internal consistency in this study was fair to good, with Cronbach's alpha for the total PANSS of .80, and for each of the subscales as follows: Positive (.83), Negative (.79), Cognitive (.73), Hostility (.51), and Emotional Discomfort (.62)

Trauma exposure. Lifetime history of stressful and traumatic events was assessed with the Trauma History Questionnaire, Revised (THQ–R). The THQ–R is a 24-item interview used in previous studies of trauma and severe mental illness (Mueser et al., 1998). Items are behaviorally anchored and assess for a wide range of lifetime stressful events. Each event reported by the participant is coded by type (e.g., natural disaster, sexual assault, witnessing death of other, etc.), the age at the time of event, and whether the event meets *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–IV*) PTSD Criterion A1 ("actual or threatened death or serious injury, or a threat to the physical integrity of self or others"; American Psychiatric Association, 1994, p. 427). Interviewers also assessed each event for Criterion A2 (participant experienced "fear, helplessness, or horror," p. 428). We calculated the total number of Criterion A events experienced, as well as the total number of all events (Criterion A plus non-Criterion A events) to use as continuous measures of trauma exposure.

PTSD assessment. The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995) was used to assess PTSD diagnosis and symptom severity. The CAPS is a semistructured interview widely used in PTSD research. The CAPS assesses separate dimensions of symptom severity (frequency and intensity), has explicit anchors and descriptors for ratings, and provides detailed follow-up questions (Weathers et al., 2001). Psychometric studies have validated both dichotomous (meets or does not meet criteria for a symptom, or for a diagnosis) and continuous (severity of disorder or symptom cluster) data yielded by the CAPS (Weathers et al., 2001), which is of particular interest in this study.

The standard administration of the CAPS begins with a review of lifetime traumatic events, and a selection of the most stressful event that meets Criterion A. Because Criterion A must be met in order to assign a PTSD diagnosis, the CAPS generally is not completed in the absence of a Criterion A trauma. However, we modified the procedure to obtain PTSD symptom severity scores for all participants, including those without a Criterion A trauma. Participants were prompted through a series of questions to choose the most stressful of the Criterion A events reported. If the participant reported events on the THQ–R, but none met Criterion A, the interviewer requested the participant to identify the most stressful event as the basis for the CAPS. If the participant did not report any events on the THQ–R, the interviewer prompted the participant to select some distressing experience in his or her lifetime. Once the focal event was selected, the CAPS interview continued following the standard procedure. This procedure was generally successful in identifying the most appropriate event to use for the PTSD assessment. However, due to interviewer error, in three

instances non-Criterion A events were selected as the basis for assessment despite the presence of another event that did meet Criterion A.[1]

CAPS scoring. Each CAPS symptom is rated separately on frequency and intensity using a scale of 0 to 4, with higher scores indicating greater severity. We followed *DSM–IV* criteria for assigning a diagnosis, rating a symptom as present when rated "1" in frequency and "2" in intensity, as described by Weathers, Ruscio, and Keane (1999). PTSD severity was defined as the sum of all frequencies and intensities (Weathers et al., 1999).

Two procedures were adopted to maximize the validity of the symptom ratings. First, we followed CAPS protocol by rating the nine Avoidance and Hyperarousal symptoms not directly tied to the trauma (e.g., sleep disturbance, irritability) as either *definitely*, *probably* or *unlikely* to be trauma-related. The interviewer considered several factors to make this clinical judgment, including the onset of the symptom in relationship to the target trauma (i.e., symptoms that preceded the target trauma were coded as *unlikely* to be trauma-related), the phenomenology of the symptom (i.e., distinguishing between flashbacks and hallucinations), and the perceptions of the interviewee. We collapsed this category into a dichotomous rating: Symptoms judged by the interviewer as *unlikely* to be trauma-related were recoded as absent, and were not considered in the determination of a diagnosis, nor included in the calculation of the PTSD severity score; symptoms coded as either *definitely* or *probably* trauma-related were retained. The percentage of symptoms judged *unlikely* to be trauma-related ranged from 38% (hypervigilance) to 72% (concentration problems).

We also utilized the Global Validity rating of the CAPS (Criterion G), which is based on the interviewer's impression of the validity of the participant's responses. This CAPS item is rated on a 5-point scale: *excellent* (no reason to suspect invalid responses), *good* (factors present that may adversely affect validity), *fair* (factors present that definitely reduced validity), *poor* (substantially reduced validity) and *invalid* (severely impaired mental status or possible deliberate faking bad or faking good responses). We dichotomized this item as well, and thus interviews rated *excellent* or *good* were considered to be valid and included in analyses, whereas those rated *fair* or *poor* (*n* = 2) were disregarded.

Internal consistency reliability (Cronbach's alpha) was calculated for the total CAPS and for the three subscales using symptom sum scores (intensity + frequency). Reliability here was adequate to good, with Cronbach's alpha for the total CAPS at .91, and for the subscales as follows: Reexperiencing (.70), Avoidance (.85), and Hyperarousal (.78).

Trauma disclosure. Participants were asked several questions about their prior disclosure of trauma and knowledge of any prior diagnosis or treatment of PTSD.

Procedure

In order to reduce potential interviewer bias, the SCID–I/P and PANSS were conducted in separate interviews with a different interviewer than the trauma and PTSD assessments. In the first interview, the research assistant obtained informed consent and administered the SCID–I/P and PANSS.

The second interview was conducted an average of 9.9 days (*SD* = 7.1) after the first. Most follow-up interviews (83%) were conducted within 14 days, with 98% of interviews conducted within 4 weeks of the first interview. The remaining measures were completed during this interview (THQ–R, CAPS, and trauma disclosure questions).

Participants received $5 for participation in the first interview, and $10 for the second interview.

Training and Supervision of Interviewers

Interview 1. Two research assistants conducted the initial interviews. Two steps were taken in order to ensure adequate interrater reliability. First, both raters conducted the first six interviews together, alternating as interviewer and observer, but rating independently. Intraclass correlation coefficients (ICCs) for PANSS symptom severity were high, with an ICC of .99 for the total score. ICCs for the subscales were also high, ranging between .99 (Positive) and .93 (Hostility). After initial interrater reliability was established, the two research assistants met regularly for supervision with a doctoral-level psychologist to review all SCID–I/P and PANSS ratings in order to avoid drift.

Interview 2. Three interviewers conducted the second interviews. The first author conducted the first 37 (56.9%) interviews, after which two additional interviewers were trained to complete the data collection process. The third author provided all initial training, as well as ongoing monitoring and supervision of the first author through a review of audio recordings of the interviews. The first author observed the first two interviews conducted by both of the two new interviewers, and monitored audio recordings thereafter. To establish interrater reliability, a second interviewer randomly selected and re-rated 10 audiotapes of interviews conducted by the first author. Interrater reliability for these interviews was excellent. For overall PTSD diagnosis, kappa was 1.0, indicating 100% agreement. ICCs for CAPS severity ranged from .98 (total CAPS severity) to .95 (Avoidance). Interrater reliability for the trauma assessment was also high as indicated by an ICC of .99 for the total number of traumatic events, and .96 for the total number of Criterion A events. A kappa could not be calculated on the ratings of CAPS global validity due to lack of variability; however, percentage agreement was 90% (one interviewer included all participants, whereas the other interviewer rated one interview as *fair*, and thus was not included in the analyses). Similarly, kappas could not be calculated for the dichotomized ratings of trauma-relatedness due to the small sample size and/or lack of variability for these ratings. Percentage agreement was 82% for those items for which both interviewers made a rating. There were six instances in which 1 rater thought a symptom was present when the other did not; thus only 1 rater made a determination of trauma-relatedness (four by 1 rater, and two by the other).

Sample

Sixty-five individuals signed informed consent and met with a research assistant. Twelve individuals completed only one interview: 6 did not receive confirmation of diagnosis of schizophrenia on the SCID–I/P, 3 decided not to participate further or were lost to follow-up, and 3 were unable to complete the first interview and were not approached for the second interview.

Of the 53 who participated in the follow-up interview, valid trauma and PTSD data were obtained for 47: 5 were judged by the interviewers as providing invalid trauma histories or as unable to report PTSD symptoms, and 1 did not complete the CAPS due to interviewer error. There were no significant differences on any demographic or background characteristics between the clients for whom complete and valid data were obtained and the 18 clients for whom complete and valid data were not obtained. However, those who did not complete the study and for whom the PANSS was administered (*n* = 14) had significantly higher cognitive impairment on the PANSS (*M* = 3.01, *SD* = 1.11) than completers of the study (*M* = 2.29, *SD* = .72), *t*(17) = 2.31, *p* < .05. Characteristics of the final sample are summarized in Table 1.

Data Analysis

The overall statistical analysis strategy was correlational, with Pearson correlations and multiple regression used to examine the primary research hypotheses. Descriptive statistics were calculated for all research measures, and *t* tests, analyses of variance (ANOVAs), and chi-square analyses were calculated to examine differences between groups.

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[1] No statistical analyses were affected by excluding these three cases, so they were retained in the sample.

Table 1
Demographics and Background Characteristics of Sample (N = 47)

Demographic items	*n* (%)
Gender	
Female	30 (63.8)
Male	17 (36.2)
Race[a]	
Caucasian	28 (59.6)
African American	16 (34.0)
Other	3 (6.4)
Marital status[a]	
Never married	26 (56.5)
Ever married	20 (43.5)
Education	
No high school diploma	17 (36.2)
High school diploma or GED	30 (63.8)
Current housing	
Supervised group facility	16 (34.0)
Supervised apartment	13 (27.7)
Living with family	6 (12.8)
Apartment alone or with peers	12 (25.5)
Currently working (any job)	
No	37 (78.7)
Yes	10 (21.3)
Diagnosis	
Schizophrenia	39 (83.0)
Schizoaffective disorder	8 (17.0)
Medication	
Antipsychotic only	12 (25.5)
Antipsychotic and adjunctive	30 (63.8)
Psychotropic other than antipsychotic	3 (6.4)
No medication	2 (4.3)
Alcohol use disorder	2 (4.3)
Drug use disorder	3 (6.4)

Background characteristics	*M* (*SD*)
Total PANSS	2.2 (0.5)
Emotional discomfort	2.5 (1.1)
Positive	2.4 (1.2)
Cognitive	2.3 (0.7)
Negative	2.1 (0.9)
Hostility	1.5 (0.5)
Age	44.1 (9.7)
No. of children[a]	1.0 (1.2)
Age at first hospitalization[b]	25.0 (9.6)
No. of hospitalizations[c]	7.4 (8.5)

Note. GED = General equivalency diploma; PANSS = Positive and Negative Syndrome Scale.
[a] *n* = 46. [b] *n* = 41. [c] *n* = 40.

Results

Rates of Traumatic Events

Rates of all traumatic events are listed in Table 2. All but 1 participant reported at least one THQ–R event. The mean number of Criterion A events for the sample was 3.19 (*SD* = 3.23; range = 0–12). Approximately one fourth of the sample either reported no events (*n* = 1, 2.1%), or reported no events that met Criterion A (*n* = 11, 23.4%). A majority reported experiencing at least one interpersonal Criterion A event (*n* = 30, 63.8%). Trauma experienced across the life span was also common, with 18 (38.3%) participants reporting Criterion A events in both childhood (< 16 years) and adulthood (≥ 16 years). Sixteen participants (34.0%) reported Criterion A events in adulthood only, and 2 (4.3%) experienced such an event only during childhood. Few traumatic events (*n* = 6, 4% of all events reported) occurred in the 12 months prior to the assessment.

PTSD Diagnosis and Severity

The event most commonly selected as most stressful for the purposes of the CAPS assessment was sexual assault (*n* = 16, 34%), followed by physical assault (*n* = 7, 14.9%), and sudden death of a close other (*n* = 5, 10.6%). Thirty-three (70.2%) of the 47 CAPS interviews were based on Criterion A events.

The mean CAPS severity for the entire sample was 14.6 (*SD* = 21.8). Six individuals (12.8%) met criteria for current PTSD; 5 (83.3%) were women. The mean CAPS severity for the 6 individuals meeting criteria was 56.0 (*SD* = 14.7), with CAPS scores ranging from 39 to 74. Those who had experienced a Criterion A event at some point in their lives had significantly higher total CAPS (*M* = 17.9, *SD* = 22.9 vs. *M* = 4.9, *SD* = 12.0) *t* (37) = 2.5, *p* < .05, Reexperiencing (*M* = 6.4, *SD* = 1.8 vs. *M* = 1.8, *SD* = 3.0) *t*(42) = 3.1, *p* < .01, and Hyperarousal (*M* = 7.5, *SD* = 11.0 vs. *M* = 1.3, *SD* = 3.2) *t*(44) = 3.0, *p* < .01, symptoms than those who did not have that history.

Higher CAPS scores were also associated with the experience of Criterion A events across the life span (see Table 3). Participants who had experienced at least one Criterion A event in both childhood and in adulthood had significantly higher total CAPS, Reexperiencing, and Hyperarousal symptoms than those with either Criterion A trauma in adulthood only, or those without any Criterion A trauma (the group with childhood Criterion A trauma was excluded from analyses due to small sample size). Bonferroni post hoc analyses indicated that the group with trauma in both childhood and adulthood had significantly higher scores on the total CAPS and all CAPS subscales than the adulthood-only group. Differences between these groups were large, with effect sizes ranging from .86 (Hyperarousal) to 1.43 (Reexperiencing). Those with both childhood and adulthood Criterion A trauma also had significantly higher total CAPS, Reexperiencing, and Hyperarousal scores than those without any Criterion A events. Effect sizes for this comparison were also large, ranging from 1.00 (total CAPS) to 1.10 (Hyperarousal). Those with only adulthood trauma did not differ from those with no Criterion A events on CAPS severity.

Three participants reported that a psychiatrist (*n* = 2), or family doctor (*n* = 1) had told them at some point prior to the interview that they had PTSD. However, only 1 of those individuals received a PTSD diagnosis in this study. Therefore, 5 of the 6 (83.3%) participants with current PTSD were not aware of this diagnosis.

Relationship Among Trauma, PTSD, and Schizophrenia

In order to examine the hypothesized relationship among trauma severity (sums of events), PTSD severity (CAPS), and schizophrenia severity (PANSS), correlations were computed among these variables (see Table 4). Associations between the simple sum of all events (both Criterion A and non-Criterion A) and the CAPS

Table 2
Rates of Stressful Events By Gender

Event	Male (*n* = 17)		Female (*n* = 30)		Total (*n* = 47)	
	n	%	*n*	%	*n*	%
Military combat	1	5.9	0		1	2.1
Accident[a]	7	41.2	16	55.2	23	50.0
Natural disaster	4	23.5	5	16.7	9	19.1
Serious (life-threatening) illness[a]	2	12.5	4	13.3	6	13.0
Unwanted sexual contact before age 13	3	17.6	8	26.7	11	23.4
Unwanted sexual contact between ages 13–17[b]	0		7	23.3	7	14.9
Unwanted sexual contact 18 or older[c]	3	17.6	15	50.0	18	38.3
Attacked with a weapon	4	23.5	10	33.3	14	29.8
Attacked without a weapon[d]	3	18.8	9	31.0	12	26.7
Other situation causing serious injury	2	11.8	1	3.3	3	6.4
Other situation in which feared injury or death	4	23.5	6	20.0	10	21.3
Witnessed someone seriously injured or violently killed[a]	5	31.3	5	16.7	10	21.7
Friend or family member murdered or deliberately killed	4	23.5	9	30.0	13	27.7
Any other stressful situation	6	35.3	7	23.3	13	27.7

Note. These events include both Criterion A events and events that do not meet one or both requirements for Criterion A.
[a] *n* = 46. [b] $\chi^2(1) = 4.66$, $p < .05$. [c] $\chi^2(1) = 4.81$, $p < .05$. [d] *n* = 45.

ranged from $r = .51$ ($p < .01$) for the Hyperarousal subscale to $r = .39$ ($p < .01$) for the Avoidance subscale. Associations between the CAPS and the sum of only Criterion A events were similar, ranging from $r = .48$ ($p < .01$) for both the Reexperiencing and Hyperarousal subscales to $r = .32$ ($p < .05$) for the Avoidance subscale. The Emotional Discomfort subscale was significantly associated with the CAPS total score and all CAPS subscales, as well as the two trauma severity measures (total number of stressful events and total number of Criterion A events). In addition, the Avoidance subscale was significantly correlated with the Positive subscale.

In order to further explore the pattern of correlations, we then divided our sample into several subgroups. First, we examined the pattern of correlations for only those who had experienced a Criterion A event (see Table 4). These correlations were similar to those for the total sample. We then examined the pattern of correlations by gender (see Table 5). The correlations for women ($n = 30$) were similar to that of the entire sample, although several correlations increased in magnitude and level of significance. The pattern of correlations for the men ($n = 17$) differed from that of the total sample, those with Criterion A events, and from the women. Within the subgroup of men, Avoidance was significantly

and strongly associated with Positive symptoms ($r = .67$, $p < .01$), as was the total CAPS ($r = .52$, $p < .05$).

Because of the possibility that the similarity between the patterns of correlations between women and those with a Criterion A event may be partly related to an overlap in grouping, we further examined the frequencies of these variables. There was an even split in gender between the 12 individuals who had not experienced a Criterion A event (6 men and 6 women). Furthermore, 80% of the women ($n = 24$) and 65% of the men ($n = 11$) reported at least one Criterion A event. The overall chi-square was not significant $\chi^2(1, N = 47) = 0.31$, *ns*.

Finally, we used multiple regression to examine the relative contribution of each independent variable and their interactions while controlling for the others. Using the total PANSS and each PANSS subscale as the dependent variables, we simultaneously entered gender, diagnosis (schizophrenia vs. schizoaffective), presence or absence of a Criterion A event, the interactions between gender and diagnosis and gender and presence or absence of a Criterion A event, and each continuous CAPS severity subscale into five separate regression models. None of the models was significant, and none of the independent variables or interactions reached significance.

Table 3
Timing of Criterion A Events and CAPS Severity

PTSD measure	No Criterion A events (*n* = 11)		Adulthood only (*n* = 16)		Childhood and adulthood (*n* = 16)		*F*	Bonferroni post hoc analyses
	M	*SD*	*M*	*SD*	*M*	*SD*		
Total CAPS	5.00	12.56	5.88	8.50	29.17	26.50	8.69**	C + A > none, A
Reexperiencing	1.81	3.19	2.19	3.49	10.44	7.23	13.69***	C + A > none, A
Avoidance	2.00	6.63	0.88	1.96	7.06	8.54	4.37*	C + A > A
Hyperarousal	1.18	3.31	2.81	4.18	11.67	13.58	5.96**	C + A > none, A

Note. Analyses excluded the childhood-only group because of small sample size ($n = 2$). CAPS = Clinician-Administered PTSD Scale; PTSD = posttraumatic stress disorder.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4
Correlations Between Trauma Severity and CAPS and PANSS for the Total Sample (N = 47) and Individuals With Criterion A Events (n = 35)

Trauma and PTSD measures	Total PANSS	Positive	Emotional discomfort	Hostility	Negative	Cognitive	Total no. stressful events	Total no. Criterion A events
Total no. of stressful events								
Total sample	.15	.24	.38**	−.04	−.13	.02	—	
Criterion A group	.19	.39*	.39*	−.13	−.21	.12	—	
Total no. Criterion A events								
Total sample	.14	.19	.31*	.04	−.07	−.01		—
Criterion A group	.15	.34*	.32	−.06	−.19	−.09		—
Total CAPS								
Total sample	.19	.27	.42**	−.06	−.10	.03	.50**	.47**
Criterion A group	.17	.21	.47**	−.14	−.15	.11	.52**	.45**
Reexperiencing								
Total sample	.06	.18	.34*	−.16	−.14	−.11	.47**	.48**
Criterion A group	.04	.14	.37*	−.25	−.21	−.06	.45**	.43**
Avoidance								
Total sample	.22	.33*	.33*	−.09	−.09	.11	.39**	.32*
Criterion A group	.18	.19	.41*	−.16	−.10	.15	.49**	.36*
Hyperarousal								
Total sample	.22	.23	.44**	.24	−.07	.07	.51**	.48*
Criterion A group	.23	.23	.49**	−.04	−.12	.16	.49**	.44**

Note. CAPS = Clinician-Administered PTSD Scale; PTSD = posttraumatic stress disorder; PANSS = Positive and Negative Syndrome Scale.
* *p* < .05.   ** *p* < .01, two-tailed.

Prior Disclosure

Of the 46 participants who completed the second interview and for whom these questions were asked, 18 (38.3%) reported that they had not discussed the "stressful events" reported in the interview with a counselor, 17 (36.2%) reported having never told a friend or family member about the events, and 13 (27.7%) had told no one except the study interviewer. Of the 6 participants with a current PTSD diagnosis, 5 (83.3%) reported disclosing to a counselor or therapist.

Discussion

Rates of trauma were generally comparable to past studies of trauma in people with a severe mental illness. Mueser et al. (1998) found that 98% of their sample had experienced at least one stressful event across their lifetime, the same rate reported here. Rates of specific traumatic events in this study were also comparable, although at the lower end of the range previously reported for people with a severe mental illness. For example, past studies of childhood sexual abuse have found rates between 31% and 65%

Table 5
Correlations Between Trauma Severity, CAPS, and PANSS by Gender (n = 47)

Gender and trauma/PTSD measures	Total PANSS	Positive	Emotional discomfort	Hostility	Negative	Cognitive	Total no. stressful events	Total no. Criterion A events
Male (*n* = 17)								
Total no. stressful events	.04	.23	.44	−.26	−.29	−.20	—	
Total no. Criterion A events	.06	.20	.25	−.29	−.22	−.05		—
Total CAPS	.24	.52*	.04	−.19	−.20	−.01	−.15	−.01
Reexperiencing	.24	.41	.26	−.19	−.16	−.05	.08	.17
Avoidance	.36	.67**	−.11	.03	−.18	.12	−.28	−.15
Hyperarousal	.03	.29	−.03	−.36	−.17	−.10	−.18	−.03
Female (*n* = 30)								
Total no. stressful events	.19	.26	.34	−.08	−.06	.10	—	
Total no. Criterion A events	.16	.20	.31	.01	−.01	.01		—
Total CAPS	.19	.20	.50**	−.10	−.07	.05	.67**	.57**
Reexperiencing	.02	.10	.36	−.21	−.12	−.13	.58**	.55**
Avoidance	.19	.18	.45*	−.13	−.05	.11	.61**	.44*
Hyperarousal	.26	.25	.54**	.01	−.04	.11	.65**	.56**

Note. CAPS = Clinician-Administered PTSD Scale; PTSD = posttraumatic stress disorder; PANSS = Positive and Negative Syndrome Scale.
* *p* < .05.   ** *p* < .01, two-tailed.

(Cloitre & Scarvalone, 1997; Goodman, Dutton, & Harris, 1997), as compared to 36% in our study. Similarly, reported rates of adult sexual assault in women with a severe mental illness range between 57% and 76% (Cloitre & Scarvalone, 1997; Goodman, Dutton et al., 1997), whereas the rate here was 50%. Although rates of traumatic events were similar to past research, the rate of current PTSD was 12.8%, lower than what has previously been reported in the literature for diagnostically heterogeneous groups of clients with severe mental illness (29%–43%; Cascardi et al., 1996; Craine et al., 1988; Mueser et al., 1998; Switzer et al., 1999), as well as for those with schizophrenia (28% and 29%; Mueser et al., 1998; Mueser et al., in press), but higher than the 2% point-prevalence rate of PTSD in the general population (Stein, Walker, Hazen, & Forde, 1997).

There are a number of reasons why the rate of PTSD may have been lower in this sample compared to past research. One such possibility is sampling bias. Our recruitment procedure relied upon referrals from clinicians at mental health centers, who may not have recommended participation to individuals with severe symptoms or known trauma histories due to concerns about the potential stress of the study. The low rates of recent (within the past 12 months) trauma, PTSD, and schizophrenia severity, as well as the comparatively low rates of alcohol and substance use (Regier et al., 1990), are consistent with this explanation. Another possibility is method variance; the rates of current PTSD found in four of the six previous studies have relied on self-report measures, whereas we employed a structured interview format for diagnosis. However, two other studies employing interview-based assessments of PTSD (Mueser et al., 2001; Switzer et al., 1999) reported higher rates than reported here. It is also possible that the interviewers in this study rated symptoms more conservatively than in prior studies.

Turning to the primary hypotheses of this study, there was a consistent relationship between severity of trauma and severity of PTSD symptoms with general emotional distress, observed specifically among women. Among men, PTSD Avoidance symptoms, but not Reexperiencing or Hyperarousal symptoms, were significantly correlated with Positive symptoms of schizophrenia. This pattern suggests that avoidance of trauma-related stimuli may be an especially critical symptom in clients with schizophrenia. As most of the traumatic events experienced were interpersonal in nature, avoidance of trauma-related stimuli could result in social avoidance. To examine this possibility, we explored the correlations between the social avoidance items on the PANSS with the number of interpersonal Criterion A events experienced in childhood, the number of interpersonal Criterion A reported in adulthood, and Total PTSD severity. The active social avoidance item of the PANSS, which measures a reduction in social involvement due to anxiety, suspiciousness, or mistrust of others, was significantly correlated with the total number of interpersonal Criterion A events experienced in childhood ($r = .33$, $p < .05$) and total CAPS severity ($r = .38$, $p < .01$), but not with number of adulthood interpersonal events ($r = .10$, ns). When we performed these correlations with the passive social withdrawal item of the PANSS, which examines reduced social involvement due to apathy or avolition, none of the correlations were significant, and all were close to zero (rs $= -.04$ to .02).

Numerous studies have shown that persons with schizophrenia with limited social contact are more prone to relapses and hospi-

talizations (Erickson, Beiser, Iacono, Fleming, & Lin, 1989; Perlick, Stastny, Mattis, & Teresi, 1992; Rajkumar & Thara, 1989; Strauss & Carpenter, 1977). Lack of social contacts may provide minimal opportunities for social support, reality testing, and meaningful stimulation (Buchanan, 1995; Cresswell, Kuipers, & Power, 1992; Wing & Brown, 1970). Whereas these findings are in need of replication, they suggest that reduction of avoidance, especially due to unwarranted interpersonal mistrust, may help to reduce relapse in clients with schizophrenia and PTSD.

The presence of gender differences has been one of the most robust findings in the general trauma and PTSD literature. Some of those gender differences were found here. For example, women were more likely to report having been a victim of a sexual assault after age 13 than were men. Five of the 6 individuals with PTSD in our sample were women, although this finding did not reach statistical significance. Additionally, the pattern of correlations between our variables of interest was quite different when examined by gender. In women, PTSD was consistently related to severity of Emotional Discomfort, but this was not true for men. The correlations among the men supported our original hypothesis, namely, that PTSD symptoms would be associated with psychotic symptoms. However, we remain cautious about drawing definitive conclusions about gender differences in the relationships between these two disorders, as these correlations are likely to be unstable due to the small sample sizes, and must be replicated. Furthermore, the lack of significance in the regression models suggests that we should not overinterpret subgroup differences.

Consistent with prior research, this study suggests that assessment tools for trauma and PTSD developed for the general population are appropriate for use among people with schizophrenia. Psychometric studies have demonstrated test–retest reliability of trauma and PTSD assessments (Goodman et al., 1999; Mueser et al., in press), as well as internal consistency and interrater reliability (Mueser et al., 2001) in this population. Mueser et al. (2001) also showed evidence of convergent validity of PTSD assessment by the CAPS with the PTSD Checklist (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). In addition, these results provide preliminary support of our method of using the CAPS in the absence of a Criterion A trauma. Correlations between our main variables of interest for the subsample of only those with Criterion A events were almost identical when compared to those computed for the entire sample, and our interrater reliability for CAPS ratings was excellent. So, whereas replication of this innovative use of the CAPS is necessary, it suggests that our method of using the CAPS to obtain continuous symptom ratings on a population heterogeneous for PTSD is a promising one.

This study also corroborates previous findings that most individuals with schizophrenia experience some type of trauma during their lifetime, and that rates of PTSD in this group are consistently higher than those found in the general population. Furthermore, the experience of trauma appears to be related to general mental health in individuals with a severe mental illness, as reported in prior research (Craine et al., 1988; Goodman, Dutton et al., 1997; Muenzenmaier, Meyer, Struening, & Ferber, 1993), and demonstrated here by the significant association between lifetime history of stressful events with Emotional Discomfort. Trauma has been found to be associated with a wide range of negative outcomes in people with a severe mental illness, including an increased number of psychiatric hospitalizations, time in residential treatment, cost

of care (Newmann, Greenley, Sweeney, & Van Dien, 1998), and substance use (Beck & van der Kolk, 1987; Craine et al., 1988). In our study, the experience of trauma exposure as a child and again as an adult was particularly pernicious, leading to higher levels of PTSD severity than those who had not experienced trauma at all, or who only reported trauma as an adult. Although the rate of Criterion A trauma in this sample was quite high, the relationship between trauma history and distress was similarly high when all stressful events were included in the analyses, not just Criterion A events. This, combined with the high interrater reliability for our novel use of the CAPS, might suggest that in this population, evaluating traumatic events for Criterion A may not be as relevant as in the general population.

This study also supports prior findings that PTSD is not routinely assessed, even when clients report a trauma history (Eilenberg, Fullilove, Goldman, & Mellman, 1996; Read & Fraser, 1998). Of the 6 individuals who met criteria for current PTSD, only 1 was aware of this diagnosis or had received any PTSD-specific treatment, although 4 others had disclosed their trauma history to a clinician. The lack of assessment of PTSD in clients who disclose a trauma history may be due to clinicians who are reluctant to assess a disorder for which there are few guidelines for treatment. Although there are several empirically supported treatments for PTSD in the general population (Foa, Keane, & Friedman, 2000), treatment guidelines for the treatment of PTSD in individuals with a comorbid psychotic illness have not been developed. To that end, interventions that target PTSD in individuals with schizophrenia are sorely needed.

As a final caution, our study may have been limited by both Type I and Type II errors. We conducted a large number of correlations, thereby increasing the rate of Type I errors. Were we to divide the overall alpha (.05) by the number of correlations in our main hypotheses (36), we would obtain a comparison-wise alpha of .0014, and thus only the correlations between the indices of trauma exposure with the CAPS total and two CAPS subscales (Reexperiencing and Hyperarousal) would remain significant. Furthermore, due to the modest sample size and attrition, statistical power to detect small- or medium-sized effects was limited, potentially increasing the rate of Type II errors.

In summary, this study provides preliminary support for the hypothesis that trauma and PTSD are related to higher levels of symptoms in people with schizophrenia, and suggests the need for more rigorous testing of the model using random samples and prospective designs. Given the association between PTSD and symptom severity in clients with schizophrenia, there is a need to assess PTSD routinely, as well as to develop and evaluate PTSD interventions for use with individuals with schizophrenia.

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